

(Part-I)

Q.2. Write short answers to any Five (5) questions: (10)**(i) What is meant by molecular biology?****Ans** Molecular biology (biochemistry) deals with the study of the molecules of life; e.g., water, proteins, carbohydrates, lipids, and nucleic acids.**(ii) What is tissue level? Give one example.****Ans** In multicellular organisms, similar cells (performing similar functions) are organized into groups, called tissues. We can define a tissue as a group of similar cells specialized for the performance of a common function.

There are different types of plant tissues e.g., epidermal tissue, ground tissue, etc.

(iii) Define biotechnology.**Ans** Biotechnology deals with the practical application of living organisms to make substances for the welfare of mankind.**(iv) What are qualitative observations? Give examples.****Ans** Qualitative observations are variable, cannot be measured and recorded in terms of numbers.**Example:**

The freezing point of water is colder than the boiling point.

(v) What is meant by control group in experiments?**Ans** In science when doing the experiment, it must be a controlled experiment. The scientist must contrast an "experimental group" with a "control group". The two groups are treated exactly alike except for the one variable being tested.

(vi) What is meant by summarization of results?

Ans Biologist gathers actual, quantitative data from experiments. Data for each of the groups are then averaged and compared statistically. To draw conclusions, biologist also uses statistical analysis.

(vii) What are ribosomes? Write down their functions.

Ans Ribosomes are tiny granular structures that are either floating freely in cytoplasm or are bound to endoplasmic reticulum (ER). Each ribosome is made up of almost equal amounts of proteins and ribosomal RNA (rRNA). Ribosomes are not bound by membranes and so are also found in prokaryotes. Eukaryotic ribosomes are slightly larger than prokaryotic ones. Ribosomes are the sites of protein synthesis.

(viii) What is reverse osmosis?

Ans In advanced water-treatment technologies, membrane-based filtration systems are used. In this process, semi-permeable membranes separate salts from water (reverse osmosis).

Q.3. Write short answers to any Five (5) questions: (10)

(i) Write characteristics of algae and protozoans.

Ans Algae are unicellular, colonial or simple multicellular. They resemble plant cells with cell walls and chlorophyll in chloroplasts. Simple multicellular means that they do not have multicellular sex organs and do not form embryos during their life cycles. Protozoans resemble animals whose cells lack chlorophyll and cell walls. Some protists are fungi-like.

(ii) Differentiate between autotrophs and heterotrophs.

Ans

Autotrophs	Heterotrophs
1. Organism that can prepare food from simple inorganic materials and can store energy, are autotrophs.	1. Organisms that cannot synthesize their food and depend on autotrophs or others are heterotrophs.
2. For example: Algae.	2. For example: Fungi.

(iii) **What is meant by binomial nomenclature?**

Ans Binomial nomenclature is the method of giving scientific names to living organisms. As the word "binomial" suggests, the scientific name of a species consists of two names: the first is genus name and the second one is the name of species.

(iv) **Differentiate between karyokinesis and cytokinesis.**

Ans

Karyokinesis	Cytokinesis
◆ The division of nucleus in mitosis is known as karyokinesis.	◆ The division of cytoplasm in mitosis is known as cytokinesis.

(v) **What is regeneration? Give example.**

Ans Some organisms can regenerate parts of their bodies. The production of new cells is achieved by mitosis. For example: Sea star regenerates its lost arm through mitosis.

(vi) **What is meant by diploid cells and haploid cells?**

Ans Diploid means the cells in which chromosomes are in pairs (homologous pairs); while haploid means the cells with half the number of chromosomes i.e., chromosomes are not in the form of pairs.

(vii) Define anaerobic respiration and write the name of their types.

Ans In the absence of oxygen, glucose is incompletely oxidized with less amount of energy released. In anaerobic respiration, the first phase is exactly similar to that of aerobic respiration. A molecule of glucose is broken down into two molecules of pyruvic acid. But in the second phase, pyruvic acid is not completely oxidized (due to the absence of oxygen). It is transformed into ethyl alcohol or lactic acid. In this way, many of the C-H bonds are left unbroken in the products. Anaerobic respiration is further classified as alcoholic fermentation and lactic acid fermentation.

(viii) Differentiate between oxidation and reduction.

Ans The loss of electrons is called oxidation; while the gain of electrons is called reduction.

Q.4. Write short answers to any Five (5) questions: (10)

(i) Define activation energy.

Ans All chemical reactions require activation energy. It is defined as minimum energy required to start a reaction. The need for activation energy acts as a barrier to the beginning of reaction.

(ii) Differentiate between anabolism and catabolism.

Ans

Anabolism	Catabolism
1. Anabolism includes the biochemical reactions in which larger molecules are synthesized.	1. Catabolism includes the biochemical reactions in which larger molecules are broken down.

2. Energy is utilized in anabolism.	2. Energy is released in catabolism.
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(iii) **What are prosthetic group?**

Ans Cofactors can be either inorganic (e.g., metal ions) or organic (e.g., flavin and heme). If organic cofactors are tightly bound to enzyme, they are called prosthetic groups.

(iv) **Write any two symptoms due to deficiency of vitamin C.**

Ans Two symptoms due to deficiency of vitamin C are:

1. Deficiency of vitamin C causes connective tissue changes throughout the body.
2. The disease known as scurvy results from lack of vitamin C. In this condition, the synthesized collagen is unstable. Symptoms of scurvy include muscle and joint pain, swollen and bleeding gums, slow wound healing, and dry skin.

(v) **What is peristalsis?**

Ans Peristalsis moves food from oral cavity to rectum. Peristalsis is defined as the waves of contraction and relaxation in the smooth muscles of alimentary canal walls.

(vi) **Define the terms systole and diastole.**

Ans In the human heart, when atria and ventricles relax and blood is filled in atria, the period is called cardiac diastole. Immediately after their filling, both atria contract and pump blood towards ventricles. This period in cardiac cycle is called atrial systole.

(vi) What is pus? How it is formed?

Ans White blood cells die in the process of killing the germs. These dead cells accumulate and make the white substance called pus, seen at infection sites.

(vii) What are preventive measures of dengue fever?

Ans Preventive measures for dengue fever are:

1. Don't let water stand in flower pots.
2. Regularly empty the refrigerator pan and spray the houses properly.

(Part-II)

Note: Attempt any TWO (2) questions.

Q.5.(a) Write in detail population and community levels. (4)

Ans For Answer see Paper 2017 (Group-II), Q.5.(a).

(b) Write a detailed note on cell membrane. (5)

Ans Cell Membrane:

All prokaryotic and eukaryotic cells have a thin and elastic cell membrane covering the cytoplasm. Cell membrane functions as a semi-permeable barrier, allowing a very few molecules across it while fencing the majority of chemicals inside cell. In this way, cell membrane maintains the internal composition of cell. In addition to this vital role, cell membrane can also sense chemical messages and can identify other cells.

Chemical analysis reveals that cell membrane is mainly composed of proteins and lipids with small quantities of carbohydrates. Electron microscopic examinations of cell membranes have led to the development of fluid-mosaic model of cell membrane.

According to this model, there is a lipid bilayer in which the protein molecules are embedded. The lipid bilayer gives fluidity and elasticity to membrane. Small amounts of carbohydrates are also found in cell membranes. These are joined with proteins or lipids of membrane. In eukaryotic cells, cholesterol is also present in lipid bilayer. In eukaryotic cell, many organelles e.g., mitochondria, chloroplasts, Golgi apparatus and endoplasmic reticulum are also bounded by cell membranes.

Q.6.(a) Describe importance of biodiversity. (4)

Ans **Importance of biodiversity:**

Biodiversity provides food for humans. A significant proportion of drugs are derived, directly or indirectly, from biological sources. A wide range of industrial materials e.g., building materials, fibres, dyes, resins, gums, adhesives, rubber and oil are derived directly from plants.

Biodiversity plays important role in making and maintaining ecosystems. It plays a part in regulating the chemistry of our atmosphere and water supply. Biodiversity is directly involved in recycling nutrients and providing fertile soils.

(b) Define dark reactions and write the summary of events of dark reactions. (5)

Ans **Dark reactions:**

Dark reactions do not use light directly. These reactions take place in the stroma of the chloroplasts.

The details of dark reactions were discovered by Malvin Calvin and his colleagues at the University of

California. The summary of the events of dark reactions, also known as Calvin cycle is as follows:

1. CO_2 molecules are combined with 5-carbon compounds to form temporary 6-carbon compounds, each of which splits into two 3-carbon compounds.
2. The 3-carbon compounds are reduced to 3-carbon carbohydrates by using ATP and hydrogen from NADPH. The 3-carbon carbohydrates are used to manufacture glucose.
3. The 3-carbon carbohydrates are also used to regenerate the original 5-carbon compounds. This step also utilizes ATP.

Q.7.(a) Write brief notes on carbohydrates and proteins. (4)

Ans **Carbohydrates:**

Carbohydrates are the basic source of energy for all animals. About half to 2/3 of the total calories, every animal consumes daily are from carbohydrates. Glucose is the most often used carbohydrate for energy. Other useful carbohydrates are maltose, lactose, sucrose and starch. Carbohydrates contain 04 kilocalories per gram. Humans get carbohydrates from the foods like bread, pastas, beans, potatoes, bran, rice and cereals.

Proteins:

Proteins are composed of amino acids. Proteins are essential components of the cytoplasm, membranes and organelles. They are also the major components of muscles, ligaments and tendons. So we use proteins for growth. Many proteins play role as enzymes. Proteins can also be used for gaining energy. One gram of protein contains 04 kilocalories of energy. Dietary sources of

proteins are meat, eggs, grains, legumes, and dairy products such as milk and cheese.

(b) Define cardiovascular disorders and explain myocardial infarction in detail. (5)

Ans The diseases that involve the heart or blood vessels are collectively called cardiovascular disorders. These diseases have similar causes, mechanisms and treatments.

Myocardial Infarction:

The term myocardial infarction is derived from myocardium (the heart muscle) and infarction (tissue death). It is more commonly known as a heart attack. It occurs when blood supply to a part of heart is interrupted and leads the death of heart muscles. Heart attack may be caused by blood clot in coronary arteries. It is a medical emergency, and the leading cause of death for both men and women all over the world. Severe chest pain is the most common symptom of myocardial infarction and may be in the form of sensation of tightness, pressure, or squeezing. Pain radiates most often to left arm, but may also radiate to lower jaw, neck, right arm and back. Loss of consciousness and even sudden death can occur in myocardial infarction.

Immediate treatment for suspected acute myocardial infarction includes oxygen supply, aspirin, and sublingual tablet of glyceryl trinitrate. Most cases of myocardial infarction are treated with angioplasty (mechanical widening of a narrowed or totally obstructed blood vessel) or bypass surgery (surgery in which arteries or veins from elsewhere in the patient's body are grafted to the coronary arteries to improve blood supply to heart muscles).